Section 1: Basic Data

Awarding institution/body:	**UWE**
Teaching institution:	**UWE**
Faculty responsible for programme:	**FBE**
Programme accredited by:	**CIBSE**
Highest award title:	**BSc (Hons) Building Services Engineering**
Default award title:	
Interim award title:	**BSc Built and Natural Environments** **DipHE Building Services Engineering** **CertHE Building Services Engineering**
Modular scheme title:	**Faculty of the Built Environment UG Modular Scheme**
UCAS codes:	**K290**
QAA subject benchmarking group(s):	**Building and Surveying, Engineering**
Valid until:	
Valid from:	**2002**
Authorised by:	**UG Modular Scheme Director** Date:
Version code:	**2**
Version year:	**2005**

Section 2: Educational aims of the programme

Graduate Building Services Engineers can expect to become involved in activities demanding a high level of technical competence, a clear understanding of the operational and commercial aspects of the construction industry and its role in society, and the personal attributes requisite to working in a professional capacity.

The aim is to provide a challenging educational experience that will prepare individuals for careers in this field, giving them the requisite knowledge, skills, creativity and enthusiasm to make a meaningful contribution in the successful development and management of the built environment.

Various specialist vocational themes - mechanical, electrical, public health, etc. - exist within the broad scope of building services engineering. This programme has been devised to incorporate elements from across the field, providing students with a sound foundation on which to base continuing professional development (CPD) and career progression within an employment market that values multi-skilled personnel capable of working in diverse engineering environments.

Section 3: Learning outcomes of the programme

A: Knowledge and understanding

By the end of the programme, the student should be able:	**Teaching/learning methods and strategies**
a) to apply relevant engineering principle and mathematical methods appropriate to the analysis and solution of a variety of problems of a specialised nature. b) to outline organisation and procedures associated with the procurement and management of buildings and their engineering systems, with regard to finance, law, quality control, and business practice. c) to discuss the social and ethical responsibilities of engineers working in the construction industry, and in the wider society. d) to describe the framework of statutory regulation, codes of practice and issues relating to health and safety within the built environment. e) to discuss the role of IT in supporting engineers and other construction professionals. f) to apply engineering design principles and methods. g) to describe characteristics of materials, plant and systems relevant to the field.	The acquisition of knowledge and understanding is largely through formal lectures, with supporting tutorials and associated formative assignments. Individual and co-operative project work, an element in several modules, is included to encourage development of specialist knowledge, within closely defined parameters, relevant to a range of specialisms. Modules normally consolidate students' knowledge and prepare students for assessment via formative work and feedback. A significant proportion of assignment work in several of the technical modules is laboratory-based, for which an underpinning knowledge is necessary. The inter-professional modules for full-time students, and work-based experiential learning modules for part-time students, demand a broad knowledge crossing professional and specialist boundaries. **Assessment** The majority of the modules are assessed through a combination of formal examinations and summative assessment of coursework assignments. The project modules use a range of assessment strategies, including reports, presentation, and vivas.

B: Intellectual skills

By the end of the programme, the student should be able:	Teaching/learning methods and strategies
a) to apply reflective, critical, analytical and imaginative reasoning in the solution of non-routine technical problems. b) to appraise engineering plant and systems in terms of performance criteria, commercial value and end-user acceptability. c) to select and apply a range of analytical methods to define parameters and model physical phenomena. d) to evaluate commercial potential and limitations in a range of engineering activities to determine optimum solutions. e) to formulate persuasive arguments in support of concepts, results, ideas and beliefs.	Lectures and tutorials provide the basic framework within which the intellectual skills are defined, with directed learning by formative assignments providing opportunities for their application. In the early modules, tutorials provide the opportunity to reinforce routine problem-solving abilities. At the higher levels, case studies and exemplar projects are used to channel thinking, with carefully chosen project assigments and practical investigations to encourage the creative, structured and analytical approach to new problems required of the graduate engineer. The dissertation also requires students to develop their intellectual skills. **Assessment** A balanced combination of examinations, written laboratory, design and technical reports. Poster papers form one element of assessment used in the Design Systems module. The dissertation assesses the students ability to apply intellectual skills to explore a hypothesis, carry out a design project or explore solutions to a problem.

C: Subject, Professional and Practical Skills

By the end of the programme, the student should be able:	Teaching/learning methods and strategies
a) to select and use scientific and technical equipment to indertake practical experimental investigations into building envelope and system characteristics. b) to competently perform all stages of the preparation of design proposals, including feasibility analysis, sketch and detailed design studies, financial evaluation, installation management, commissioning, and design realisation feedback appraisal. c) to select and use specialist CADD applications and analytical tools in the solution of problems and the production of designs. d) to maintain a professional approach in matters relating to self-appraisal, personal development, relationships with clients and colleagues, and be able to work effectively at all levels in a team to achieve collective goals. e) to demonstrate accepted standards of conduct and ethics with regard to the environmental, health and safety responsibilities of a professional engineer working in the industry.	Discrete design assignments are a common feature of several core modules, and larger projects form the substantial content of others. The use of a wide range of specialist hardware and software is a requirement, and is well supported by the teaching. Initiation to basic tools for investigation and design starts with the Design Systems module, and progresses with detailed applications in the Building Services Design module. Several core technical modules - Building Services Engineering, Energy Systems, Acoutics and Noise Control, Building Services Systems Performance - include significant laboratory-based learning activity, with formative assignments devised to encourage both subject-specific and generic skills development. Professional issues are explored within the inter-professional (FT students) and experiential learning (PT students) modules, with progression to the level III module, Professional Issues for Engineers. Seminars and group discussions form a major component of the learning activity in these modules. **Assessment** Inter-professional and experiential learning modules are assessed through a combination of oral presentation and written reports. The core BS Design module is also assessed by means of a presentation/viva. Presentations, with their element of Q&A, are commonly used across the programme where a deeper examination of subject-specific and professional skills development is required.

D: Transferable skills and other attributes

By the end of the programme, the student should be able:	**Teaching/learning methods and strategies**
a) to identify, access, research, manipulate and interpret data and information. b) to communicate information and ideas orally and using written documents, graphical techniques, and electronic media. c) to plan and execute appropriate research methods to illuminate solutions to problems in a range of subject areas. d) to engage in inter-personal activities; demonstrate leadership and teamwork attributes, chair meetings, review, summarise and evaluate arguments, recognise conflict and negotiate to reach optimal outcomes. e) to adapt to be able to work productively in unfamiliar environments and obtain maximum benefit from available resources.	Dissertation and project modules are included in the programme to encourage development of the higher level transferrable skills, though all modules incorporate elements which promote acquisition of these skills to some degree. **Assessment** Assessment predominantly by written technical, management and design reports, presentation of case-studies and assessment of group-working activities, both in the design studios and laboratories. Assessment regulations for the placement are set out in Volume I of the UG Modular Scheme documentation which can be accessed through the web link above.

Section 4: Programme structure

FIGURE 1: AWARD STRUCTURE DIAGRAM

BSc (HONS) BUILDING SERVICES ENGINEERING

Recommended Routeway for Full-Time Students

YEAR 1

SEM 1	Environments & Construction Materials UBCLC5-20-1	Engineering Maths 1 UFQEFH-20-1	Introduction to Mechanical Engineering UFMEBG-10-1	Process of Develop-ment UBIL75-10-1	Business Economics & Management for the Built Environment UBIL6Y-20-1	Design Systems (BSE) UBCLFM-20-1	Electr-technol-ogy UBCLCH-10-2	Building Services Engin-eering UBCLCB-10-2
SEM 2								

YEAR 2

SEM 1	Fluid Mechanics UBCLCL-20-2	Project Planning & Economics UBCLCN-20-2	Energy Systems UBCLD6-10-2	Analysing of Building Perfor-mance UBCLFY-10-2	Shared Elective	Building Services Design B UBCLG3-15-3	Heat Transfer UFMEBU-15-2	
SEM 2					Shared Elective			Inter-professional Development Project UBIL76-10-2

YEAR 3

SEM 1	Architectural Acoustics & Noise Control UBCLD7-20-3	Professional Issues for Engineers UBCL5N-20-3	Environ-mental Assessment UBGLDH-10-3	Main-tenance & Facilities Managt UBCL5S-10-3	Dissertation A UBILF3-20-3	Building Services Systems Performance B UBCLFX-30-3	Inter-disciplinary Issues UBIL4N-10-3
SEM 2							

BSc (HONS) BUILDING SERVICES ENGINEERING

Recommended Routeway for Part Time Day Release Students

PT1.1

SEM 1	Environments & Construction Materials UBCLC5-20-1	Design Systems (BSE) UBCLFM-20-1	Building Services Engineering UBCLCB-10-2	Process of Develop-ment UBIL75-10-1
SEM 2				

PT1.2

SEM 1	Business Economics & Management for the Built Environment UBIL6Y-20-1	Electr-technol-ogy UBCLCH-10-2	Engineering Maths 1 UFQEFH-20-1	Introduction to Mechanical Engineering UFMEBG-10-1
SEM 2				

PT2.1

SEM 1	Project Planning & Economics UBCLCN-20-2	Energy Systems UBCLD6-10-2	Analysing Building Performance UBCLFY-10-2	Fluid Mechanics UBCLCL-20-2	Experiential Learning A (Decision Making) UBILJF-20-2
SEM 2					

PT2.2

SEM 1	Building Services Systems Performance B UBCLFX-30-3	Experiential Learning (CEME) B UBCLPR-20-3	Building Services Design B UBCLG3-15-3	Heat Transfer UFMEBU-15-2
SEM 2				

PT3

SEM 1	Architectural Acoustics & Noise Control UBCLD7-20-3	Professional Issues for Engineers UBCL5N-20-3	Environmental Assessment UBGLDH-10-3	Main-tenance & Facilities Manag't UBCL5S-10-3	Dissertation A UBILF3-20-3
SEM 2					

The course considers a broad spectrum of building services from both mechanical and electrical engineering.

Principles introduced in core modules at level 1 in Environments and Construction Materials, Engineering Mathematics, and Design Systems, are applied in range of contexts including energy studies, M & E design, and acoustics.

Intermediate modules, such as Heat Transfer and Fluid Mechanics, provide the opportunity to study of relevant specialist engineering principles to greater depth.

Final stage modules, including Building Services Design, and Systems Performance, develop a variety of vocational themes allowing students to apply areas of specialist expertise in an integrated holistic approach to problem solving. Business, professional and ethical issues are also covered, with modules in Project Planning & Economics, Inter-professional studies, Professional Issues for Engineers, and Maintenance & Facilities Management.

In Experiential Learning modules, part-time students base projects on work undertaken in the workplace and completed, where possible, during the summer recess under the supervision and

guidance of the module tutors.

Full-time students can further broaden their curriculum by choosing from the wide range of 'shared elective' modules offered across the Faculty. The may also elect to take a sandwich placement after the completion of 200 credits with at least 90 at level 2 or above.

Core modules

Level 1
UBIL6Y-20-1: Business Economics & Management for Construction (20)
UBCLFM-20-1: Design Systems (BSE) (20)
UFQEFH-20-1: Engineering Maths 1 (20)
UBCLC5-20-1: Environments and Construction Materials (20)
UFMEBG-10-1: Introduction to Mechanical Engineering (10)
UBIL75-10-1: The Process of Development (10)
Level 2
UBCLFY-10-2: Analysing Building Performance (10)
UBCLCB-10-2: Building Services Engineering (10)
UBCLCH-10-2: Electro Technology (10)
UBCLD6-10-2: Energy Systems (10)
UBCLCL-20-2: Fluid Mechanics (20)
UFMEBU-15-2: Heat Transfer (15)
UBCLCN-20-2: Project Planning and Economics (20)
Level 3
UBCLD7-20-3: Architectural Acoustics and Noise Control (20)
UBCLG3-15-3: Building Services Design B (15)
UBCLFX-30-3: Building Services Systems Performance B (30)
UBILF3-20-3: Dissertation A (20)
UBGLDH-10-3: Environmental Assessment (10)
UBCL5S-10-3: Maintenance & Facilities Management (10)
UBCL5N-20-3: Professional Issues for Engineers (20)

Optional modules

Students must select 40 credits from the following modules. NOTE Experiential modules can only be taken by students in relevant employment
20 Credits Shared Electives
UBILJF-20-2: Experiential Learning A (Decision Making) (20)
UBCLPR-20-3: Experiential Learning B (CEME) (20)
UBIL76-10-2: Inter-professional: Development Project (10)
UBIL4N-10-3: Interdisciplinary Issues (10)

Placement

120 P credits
Placements

Target Award

BSc (Hons) Building Services Engineering

360 credits with at least 100 credits at level 3, at least a further 100 credits at level 2 or above and a further 140 credits at level 1 or above

Default Award

Interim Awards

CertHE Building Services Engineering

120 credits with at least 100 credits at level 1 or above

DipHE Building Services Engineering

240 credits with at least 100 at level 2 or above and a further 120 at level 1 or above

BSc Built and Natural Environments

300 credits with at least 60 at level 3 or above, a further 100 at level 2 or above and a further 120 at level 1 or above

Section 5: Entry requirements

See also the Standard faculty entry requirements apply.

Students must meet the requirements for an Engineering accredited course as set out by SARTOR. All students are normally required to have achieved:-

(i) Grade C or above in GCSE Maths and English

(ii) 'A' level Maths or Physics, or Edexel NC with Maths and Environmental Science at level III

Students who have completed an EdExcel HNC in Building Services Engineering will be exempt from all the modules recommended for PT1 and PT2 or FT Year 1 (120 AL credits).

Students who have completed the EdExcel Professional Development Diploma will be exempt from all the modules recommended for PT1, PT2 and PT3 other than Experiential Learning A or the 20 credits shared electives (180 AL credits).

Section 6: Assessment Regulations

The assessment regulations for the programme are set out in the latest version of the University's Modular Assessment Regulations.

Assessment regulations for the placement are included in Volume 1 of the UG Modular Scheme documentation and may be accessed through the link to placements above under the section on the Programme Structure.

Section 7: Student learning: distinctive features and support

1. Subject focus

This programme provides students with a sound foundation on which to base career progression within an employment market that values multi-skilled personnel capable of working in diverse engineering environments.

2. Entry with accrediation of prior learning

The curriculum has been planned to optimise AL credit available for applicants holding Edexcel HNC and PDD qualifications in building services engineering, effectively providing the 'matching section' needed to achieve the educational standard required for Incorporated Engineer registration under SARTOR3.

3. Support for part-time day release study

The programme is distinctive in the support provided for part-time students.

4. Placement opportunities

The programme offers full-time students the opportunity to complete a sandwich placement and to obtain placement credit on completion of a diary and reflection report as well as receipt of a successful employer's report.

Section 8: Reference points/benchmarks

1. Engineering Council Standards and Routes to Registration (SARTOR) for Engineers (3rd Edition: 1997 and as amended)

2. CIBSE Guidance Notes to the Academic Content Requirements for Degree in Building Services Engineering

3. QAA Engineering/Building and Surveying benchmark statements